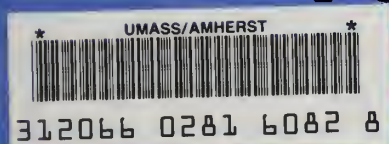


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# STRUCTURE OF THE MASSACHUSETTS JOB MARKET: VOL. I, TEXT



OCCUPATION/INDUSTRY RESEARCH PUBLICATION

Massachusetts Division of Employment Security

job market research





THE COMMONWEALTH OF MASSACHUSETTS  
DIVISION OF EMPLOYMENT SECURITY  
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STRUCTURE OF THE MASSACHUSETTS JOB MARKET:  
A RESOURCE AND DEVELOPMENT GUIDE  
VOLUME I - TEXT

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## PREFACE

This report, Structure of the Massachusetts Job Market, is composed of three volumes.

- Volume I, Text
  - executive summary
  - scope of the report
  - section detailing both the technical documentation for and the explanations of the tables presented in Volumes II and III
  
- Volume II, Occupations
  - tables depicting the industrial composition of selected occupations and occupational groups, as well as descriptions of the industries at the 2-digit, 3-digit, and major division level of detail
  
- Volume III, Industries
  - tables providing detailed data concerning the occupational profile of selected industries, as well as descriptions of the industries at the 2-digit, 3-digit, and major division level of detail



## ACKNOWLEDGEMENTS

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# STRUCTURE OF THE MASSACHUSETTS JOB MARKET

## EXECUTIVE SUMMARY

This guide provides detailed information on the occupational staffing patterns of selected industries and on the industrial distribution of selected occupations in Massachusetts.

- . Occupational profiles for nearly 185 industries.
- . Industry employment for approximately 250 occupations.
- . Detailed data for 1,800 occupations and 375 industries available for reference at the Job Market Research Service.

Matrices are an aggregation of data collected as part of the Occupational Employment Statistics (OES) program.

- . OES survey: a triennial mail survey with a large sample from each industry.
- . Matrices were compiled from OES surveys conducted in 1977, 1978, 1979, and supplemented by data from other sources.
- . All industry employment totals were adjusted to the base year 1978.

OES survey-based matrices represent the most detailed tabulations of occupational employment data ever assembled.

- . Occupation by industry matrices: the distribution of employment by detailed industry for each occupation.
  - . Matrices are valuable in alerting users to the wide range of industries in which some occupations are represented. In 1978 computer programmers numbered approximately 7,300 and were distributed throughout the economy as follows: 40.3 percent in services, 24.4 percent in manufacturing, 19.4 percent in finance, insurance, and real estate, and 8.7 percent in trade.
- . Industry by occupation matrices: the distribution of employment by detailed occupational title within an industry.
  - . Of the more than 136,100 people employed in the hospital industry, almost 70 percent were engaged in white-collar type activities. Professional nurses represented the largest share of employment, 23 percent, in this industry.



Benefits of and uses for occupational/industrial matrices:

- . Understanding the interaction between industries and occupations in the Massachusetts job market.
- . Developing reliable data and trends in occupational employment.
- . Planning and evaluating classroom and on-the-job training programs.
- . Job developing for new entrants, reentrants, and individuals in career transition.
- . Establishing a comprehensive occupation information system.
- . Projecting future employment requirements, by industry and by occupation.



## SCOPE OF REPORT

This guide provides detailed information on the occupational staffing patterns of Massachusetts industries and the industrial distribution of occupations. Such information will provide program planners, administrators, job developers, vocational counselors and others concerned with the world of work and the nature of jobs with information on a variety of issues. This publication provides answers to questions concerning the types of industries that employ persons in specific occupations and highlights the occupations most frequently employed in the different industries of the state.

This report updates the JOB DEVELOPMENT RESOURCES GUIDE FOR THE EMPLOYMENT AND TRAINING SYSTEM. It substitutes the 1978 Occupational Employment Statistics (OES) survey-based matrix for the 1974 census-based matrix, the data source for the JOB DEVELOPMENT RESOURCES GUIDE.

The OES is a triennial mail survey of a large sample of nonfarm establishments which gathers data on wage and salary employment by occupation. The OES program provides the most detailed occupational employment data available from any source. The OES survey provides information on most of the nearly 400 specific industries as defined in the 1972 Standard Industrial Classification (SIC) Manual. Over 1800 specific occupations whose definitions are easily related to the definitions in the Dictionary of Occupational Titles (DOT), Fourth Edition, 1977 and Vocational Education and Occupations are used.

The major differences between the survey-based matrix (OES) and the census-based matrix are:

- (1) greater number of occupations in the OES survey (1800 vs 377 in the census)
- (2) greater number of specific industries (372 vs 200)
- (3) census occupations are based on job titles provided by workers, while the OES occupations are defined by employers who are given clear written descriptions of the job duties associated with an occupational title
- (4) the survey-based matrix counts jobs at place of work, while the census-based matrix counts people in their primary job only, by place of residence





Occupational data were obtained from OES surveys conducted in 1977 for manufacturing 1/; 1978 for services, construction, finance, insurance, and real estate ; 1979 for wholesale and retail trade, transportation, communications, and utilities, and state and local government; and supplemented by data from other sources for education, hospitals 2/, religious institutions, and the federal government (1977).

This report is composed of three volumes. Volume I contains an executive summary of the report, an overview of the scope of the report, and a section detailing both the technical documentation for and the explanations of the tables presented in volumes II and III. Volume II presents tables depicting the industrial composition of selected occupations and occupational groups. The tables in volume III provide detailed data concerning the occupational profile of selected industries, as well as descriptions of the industries at the 2-digit, 3-digit and major division level of detail.

Industry employment estimates in this publication were adjusted to the base year 1978. Although the employment levels of some industries have changed dramatically during the past three years, historical data have shown that occupational staffing patterns remain relatively unchanged in the short run. Thus an updated occupational estimate can be derived with a good degree of confidence by applying the published occupational percentage to the current industry employment estimate.

- 
- 1/ Since this matrix was constructed, the 1980 manufacturing survey has been completed. Occupation/Industry Research staff carefully evaluated differences between the 1977 and 1980 surveys. It has been determined that the significant differences which existed between the two surveys in the staffing patterns of three manufacturing industries (SIC's 355 - special industry machinery, 357 - office computing, and accounting machines, and 367 - electronic components and accessories) could be attributed to higher response rates and improved estimating procedures of the 1980 survey. In order to give a truer indication of the occupational staffing patterns of these three industries, refinements were made to the data presented in this publication.
- 2/ In the interim, Massachusetts has conducted surveys in both education (1979) and hospitals (1980). In light of these surveys the occupational compositions of both of these industries were reviewed and refinements made to reflect more updated and state specific information.



## TECHNICAL DOCUMENTATION AND EXPLANATION OF TABLES

### Volume II - Industrial Compositions of Selected OES Occupations and Occupational Groups

The selection of occupations for which industry detail are presented were based on the following criteria:

- (1) The occupation accounted for at least 0.05 percent of statewide nonfarm wage and salary employment.
- (2) The occupation was not in the managers, officials or proprietors category. 1/
- (3) The occupation is neither a laborer position, nor an unskilled service or operative job that requires little or no training either for entry or on-the-job.

The first criteria was applied because job and training opportunities would be relatively inconsequential with fewer than 0.05 percent, or about 1200, nonfarm jobs in the occupation.

Managers, officials and proprietors were excluded since these occupations seldom provide jobs for individuals new to or reentering the labor force. This seemed to be particularly true for vocational education participants. Occupations that do not require some specific training - vocational, in school, on-the-job, or through formal apprenticeship-were also excluded since they are not likely targets for programs at either educational or industrial facilities or institutions.

Many occupations that require a degree at the graduate or undergraduate level, while beyond the scope of most vocational education systems, apprenticeship programs and on-the-job training, were included because information about the industry occupational distribution should prove valuable to guidance counselors, students, job developers and job seekers.

For each of the occupations presented in this study, the matrix process code, the job title and an estimate of the total number of statewide jobs in 1978 are shown. Employment in the occupation is allocated by industry based on the Standard Industrial Classification System (SIC) 1972. Employment in the occupation for a given industry and the percent that industry represents of total occupational employment is provided. 2/ An industry appears only if 20 or more are employed in that occupation. An example of the industrial distribution of Engineers is shown below.

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1/ The summary category managers, officials, or proprietors was included.

2/ For a few occupations where refinements were made, particularly the employment for SIC's 355, 357, and 367 in the Occupation by Industry Matrix, totals may not correspond exactly to those of the adjusted Industry by Occupation Matrix.



OCCUPATION BY INDUSTRY  
INDUSTRY DISTRIBUTION OF OCCUPATIONAL EMPLOYMENT

1020000 ENGINEERS

PROCESS + SIC CODE	EMPLOYMENT IN OCCUP	% OCC EMP
00 000	41675	100.0
30 000	650	1.6
30 150	288	.7
30 152	51	*
30 154	237	.6
30 160	180	*
30 161	100	*
30 162	80	*
30 170	182	*
30 171	63	*
30 173	98	*
40 000	26030	62.5
41 000	24501	58.8
41 250	38	*
41 251	30	*
41 320	272	.7
41 329	252	.6
41 330	325	.6
41 331	26	*
41 335	235	.6
41 340	1490	3.6
41 342	464	1.1
41 343	186	*
41 344	133	*
41 345	49	*
41 346	142	*
41 347	26	*
41 348	240	.6
41 349	244	.6
41 350	5685	13.6
41 351	395	.9
41 353	51	*
41 354	447	1.1
41 355	1156	2.8
41 356	349	.8
41 357	3116	7.5
41 358	70	*
41 359	102	*
41 360	9826	23.6
41 361	237	.6
41 362	476	1.1
41 363	44	*
41 364	299	.7

This table shows:

- (1) There are 41,675 engineers in Massachusetts.
- (2) 62.5 percent of the engineers are in manufacturing (Code 40 000).
- (3) Durable goods (Code 41 000) accounts for 58.8 percent of the engineers.
- (4) Electrical machinery, equipment and supplies (SIC 36) employs 9,826 engineers.

\* Less than .5 percent





The industry process code is a five-digit code. The first two digits indicate the major industry division as shown below:

- 00 - Total, all industries
- 20 - Mining (Div. B)
- 30 - Construction (Div. C)
- 40 - Manufacturing (Div. D)
- 41 - Durable Goods - Manufacturing
- 42 - Nondurable Goods - Manufacturing
- 50 - Transportation, Communications, Utilities (Div. E)
- 60 - Wholesale and Retail Trade
- 61 - Wholesale Trade (Div. F)
- 62 - Retail Trade (Div. G)
- 70 - Finance, Insurance, Real Estate (Div. H)
- 80 - Services (Div. I)
- 90 - Government <sup>1/</sup>

The third through fifth digits are the two (followed by zero) and three-digit SIC codes.

Example: 41 366 Communications equipment

41 - Division D Manufacturing - durable goods

36 - Electrical and electronic machinery, equipment,  
and supplies

366 - Communications equipment

The SIC codes follow the division codes in consecutive numerical sequence. Descriptions of the industrial activity represented by the codes appear in Volume II. This section presents data on the industrial distribution of employment for approximately 250 of the 1800 occupations in the matrix.

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<sup>1/</sup> Refers to employer, not industry classification: 91 - Federal government, except post office, 92 - State government, except education and hospitals, 93 - Local government, except education and hospitals.





This section presents data on the occupational composition of : (A) major industry divisions, (B) selected major industry groups, and (C) specific industries. The criteria for selecting an industry for publication were threefold.

1. The industry must be significant in the economy of the state.
2. Industry employment equals or exceeds 0.2 percent of total nonfarm employment (approximately 5000).
3. Industry employment data which are published insure the maintenance of confidentiality for individual employers.

For each of the selected industries, nearly 185, only those occupations that account for at least two percent of industry employment are included. More detailed occupational profiles of those industries meeting our publishability criteria are available by contacting the Job Market Research Service. The occupations are arranged under the major occupational groups to which the individual occupation belongs. Thus occupations will fall into "occupational clusters" to facilitate training program considerations. An example of the occupational distribution for a selected industry is shown in the profile below. Shown is the employment in selected occupations and the percent of total industry employment which the occupation represents. It is important to keep in mind that staffing patterns were published regardless of whether the industry met the stringent publishability criteria of our regular OES surveys minimum response rate. This was done to enable users to look at the full spectrum of staffing patterns. Those industries meeting our publishability criteria, (see Appendix), however, are published with a much greater degree of confidence. Caution should be exhibited in the indiscriminate use of data from the remaining industries. Data presented at the industry division and most major industry group levels, however, should be highly reliable. 1/

The occupations in this report are coded with unique eight-digit codes. The first two-digits indicate the broad occupational category. This is similar to the census-based martix format.

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1/ Further, it is important to note that even within publishable industries, not all the occupations which have been listed meet our publishability criteria (i.e. <50% relative error for industries with at least 70% response and <35% relative error for industries between 60% and 70% response). Generally speaking, larger occupations are more likely to meet publishability criteria. For additional clarification and more detailed occupational profiles, please refer to our individual OES survey publications.



INDUSTRY BY OCCUPATION  
OCCUPATIONAL DISTRIBUTION OF INDUSTRY EMPLOYMENT

615080 MACHINERY, EQUIPMENT, AND SUPPLIES

TITLE	CODE	EMPLOYMENT NO.	%
TOTAL, ALL OCCUPATIONS	0	23211	100.0
PROFESS, TECHN, & KINDRED WORKERS	10000000	3255	14.0
ENGINEERING, SCIENCE TECHNS	10080000	1417	6.1
ELECTRICAL, ELECTRONIC TECHNS	10080800	1415	6.1
ELECTRICAL & ELECTRONIC TECHN	10080803	1415	6.1
COMPUTER SPECIALISTS	10160000	492	2.1
OTHER PROFESSIONAL & TECHN WKRS	10240000	1235	5.3
ALL OTHER PROFESSIONAL WORKERS	10243800	519	2.2
ALL OTHER PROFESSIONAL	10243899	519	2.2
MANAGERS, OFFICIALS, PROPRIETORS	20000000	1906	8.2
OTHER MANAGERS, OFFICIALS, PROPS	20060000	1479	6.4
OTHER MGRS, ADMINISTRATORS	20061600	1479	6.4
WHOLESALE	20061615	656	2.8
ALL OTHER MANAGERS	20061699	823	3.5
SALES WORKERS	30000000	5600	24.1
OTHER SALES WORKERS	30001800	5600	24.1
ALL OTHER SALES WORKERS	30001899	5372	23.1
CLERICAL WORKERS	40000000	6765	29.1
STENCS, TYPISTS, SECRETARIES	40020000	1322	5.7
SECRETARIES	40020200	975	4.2
OTHER CLERICAL WORKERS	40060000	5207	22.4
BOOKKEEPERS	40060600	738	3.2
COMPUTER CLERKS, EX FOOD	40061600	1186	5.1
ORDER CLERKS	40061604	1186	5.1
SHIPPING, RECEIVING CLERKS	40065000	1000	4.3
SHIPPING & RECEIVING CLERKS	40065001	535	2.3
SHIPPING PACKERS	40065002	465	2.0
STOCK CLERKS, STORE KEEPERS	40065400	482	2.1
STOCK CLERKS, STOCKRM, WAREHS, E	40065404	482	2.1
ALL OTHER CLERICAL WORKERS	40066800	1330	5.7
GENERAL CLERKS, OFFICE	40066811	1302	5.6
CRAFTS & KINDRED WORKERS	50000000	3980	17.1
MECHS, REPAIRERS, INSTALLERS	50080000	3034	13.1
HEAVY EQUIP MECHS, INCL DIESEL	50081800	677	2.9
ENGINEERING EQUIPMT MECHANICS	50081803	677	2.9
OFF MACH SERVICERS/CASH REG SER	50082400	2010	8.7
OPERATIVES	60000000	727	3.1
LABORERS, EXCEPT FARM	80000000	835	3.6

This table shows:

- (1) There are 23,200 people employed in the machinery, equipment and supplies industry.
- (2) 29.1 percent of this industry's workforce were employed in clerical-type activities.



The major categories are:

- 00 - All occupations
- 10 - Professional, technical, kindred
- 20 - Managers, officials, proprietors
- 30 - Sales workers
- 40 - Clerical workers
- 50 - Crafts and kindred workers
- 60 - Operatives
- 70 - Service workers
- 80 - Laborers, except farm

The third and fourth digits indicate a subdivision of the major group. Thus code 10 20 0000 - indicates that under the professional category fall the group of engineers. The fifth and sixth digits indicate a specific census occupational title such as:

- 10 02 0400 - Chemical engineer
- 10 02 0800 - Electrical engineer
- 10 02 2000 - Other engineers

The seventh and eighth digits expand the detail still further and indicate a specific OES occupation. For example, other engineers - 10 02 0000 includes:

- 10 02 2003 - Traffic engineer
- 10 02 2004 - Nuclear engineer

A comprehensive list of the occupational titles included in the Occupation/ Industry Matrix may be found in the Appendix of the publication, 2.5 Million Jobs - The Variety and Distribution of Occupations in Massachusetts: 1978.

In addition an alphabetical index to the OES Survey Dictionary and the OES Dictionary of Occupations is available for reference at the Job Market Research Service of the Massachusetts Division of Employment Security. If additional information or technical assistance is sought, please call 617-727-7435.





# APPENDIX

## INDUSTRIES MEETING PUBLISHABILITY CRITERIA BY SURVEY-ROUND

### 1977 Manufacturing

SIC 20	SIC 264	SIC 342
201	277	347
202	279	351
205	285	353
208	301	363
209	307	366
22	31	372
224	313	38
225	314	382
226	317	385
228	321, 322, 323	386
229	324, 325, 326	387
238	327, 328 and 329	39
25	322	391
251	327	394
26	329	
262	34	
	341	

### 1978 Non-Manufacturing

SIC 10-14	SIC 72	SIC 81
15-17	73	83
162	75	832
60 and 61	751	836
602	78	839
603	783	84
62 and 67	79	841
621	80 (except 806)	86
63, 64, 65 and 66	805	869
655	808	89
70	809	891





1979 Wholesale and Retail Trade and Regulated Industries

SIC 41	SIC 492	SIC 531
413	493	565
415	50 and 51	55
44	501	554
45	503	555
451	507	57
458	52	572
47	521	59
481	525	598
49	53 and 56	

1979 State and Local Government

(except for SIC's 01-09, 806, 821, 822, 824, and 829)

Recent Surveys not included in 1978 Matrix

1979 Education

1980 Manufacturing

1980 Hospitals

1980 Federal Government

1981 Non-Manufacturing





